Prevent the Pathway!

An investigation into how aquatic nuisance species are spread

Activity

Students study a poster to identify 10 ways in which ANS may be spread to local aquatic ecosystems.

Grade level: 6-8
Subjects: Ecology, Science
Setting: Classroom
Duration: 1 class period
Key Terms: Introduction pathway, volitional movement

Objectives

- Students will explore ways in which ANS may be introduced and spread into an aquatic ecosystem.
- Students will brainstorm and discuss how these introduction pathways can be minimized to prevent or slow the spread of ANS.
- Students will determine things they can do to help stop the spread of ANS.

Materials

- Prevent the Pathway poster
- Copies of *Prevent the Pathway Worksheet*

Background

Aquatic nuisance species can come from any country in the world and may be introduced into new ecosystems in a variety of ways (see "Where in the World" activity). The means and routes by which ANS are introduced into an aquatic ecosystem are called **introduction pathways**. Some species migrate into new areas on their own (**volitional movement**), while others may be carried into new areas by natural events such as hurricanes or floods. The vast majority of invasive species are spread into new water bodies as a direct result of human activities. Whether intentionally or by accident, once an ANS is introduced and becomes established in a new ecosystem, it is very costly and difficult to control or eradicate them. Often the best approach to preventing the introduction or further spread of ANS is to educate the public on

the potential pathways of introduction and steps each person can take to stop the spread of ANS in their local community.

How do ANS get here in the first place? - **HUMAN ACTIVITY!** The following are some of the more common ways ANS may be introduced or spread from one water body to another.

- Movement of contaminated boats, boat trailers and other personal watercrafts from one water body to another.
- Spread on the clothing, boots and recreational gear of fishermen, hunters, hikers, campers and other outdoor enthusiasts.
- Transported on the fur of terrestrial wildlife or pets.
- Intentional release of unwanted pets.
- Intentional release of classroom or laboratory animals.
- Intentional release of live bait or accidental escape of live bait while fishing.
- Transported in wind or float passively on water currents (e.g., seeds).
- Volitional movement across land or through man-made locks, canals or channels.
- Intentionally planted for aesthetic reasons (e.g., purple loosestrife).
- Released in ballast water of ocean-going ships
- Hitchhike on anchors or hull of transoceanic ships.
- Escape from fish farms, aquaculture facilities, plant nurseries, ponds or personal water gardens.
- Hitchhike with commercial shipments of aquarium plants and aquaculture products such as fish or fish eggs.
- Brought to the United States and planted or released intentionally for food or recreational purposes.
- Released intentionally as a biological control of existing invader.

So what can YOU do about ANS in your community? The following are a few of the ways to help “prevent the pathways” of introduction or spread of aquatic nuisance species.

- Remove all visible mud, plant fragments, seeds, fish and animals from equipment (i.e., boats, trailers, nets, clothing, boots, buckets, dogs) before leaving a body of water.
- Remove all water from equipment (i.e., motors, live wells, boat hulls, scuba tanks and regulators, boots, waders, bait buckets, swimming floats) before leaving a body of water.
- Clean your boots before you hike in a new area. Seeds are common hitchhikers!
- Thoroughly wash and dry your equipment (and anything else that entered the water – including pets) BEFORE entering a new water body.
- Do not release unwanted pets, classroom science projects (i.e., fish, crayfish, turtles and frogs), aquatic plants or aquarium water down a storm drain or into a body of water. Instead, seal aquatic plants in a bag and place them in the trash, pour aquarium water down the toilet and donate your pet to a museum, school, community center, nursing home, friend or neighbor.
- Landscape and garden with plants native to Oregon and Washington.

- Dispose of unwanted live bait in trash.
- Never transplant water garden plants into lakes, streams or wetlands.
- Build a water garden or pond away from natural waterways to minimize flooding potential.
- Never move live fish away from a water body or release into another water body.
- Learn to identify aquatic nuisance species so you can report sightings to local authorities and avoid transporting them to new areas.
- Teach others how to identify aquatic nuisance species of Oregon and Washington and how to prevent their spread.

Preparation

- Before beginning the activity, introduce the concept of introduction pathways, and provide students with a few examples of the ways invasive species may be introduced into the aquatic ecosystem.
- Hang "Prevent the Pathway" poster at front of room, or provide each student with a personal copy of the poster.
- Make a copy of the *Prevent the Pathway Worksheet* for each student.

Directions

- Split students into small groups, or have each student work independently.
- Explain that the students will be given 5 minutes to identify at least 10 ANS introduction pathways depicted in the poster.
- Following the observation period, have the students record each introduction pathway on the *Prevent the Pathway Worksheet*.
- Next have the student's record at least one way each introduction pathway could be prevented.
- As a group, discuss each of the 10 pathways and invite the students to share their ideas about ways to prevent or slow the introduction pathways.
- Review any additional prevention measures not covered during the class discussion.

Evaluation

Wrap up the exercise by discussing the following questions:

- Did some of the introduction pathways surprise the students – Why?
- Is it possible to eliminate all of the pathways – Why or why not?
- Why is it so important to be familiar with these pathways?

Extensions

- Have students draw a poster depicting global introduction pathways.

Washington State Science & Environmental Science Standards:

6-8 LS2D – Ecosystems are continuously changing. Causes of these changes include nonliving factors such as the amount of light, range of temperatures, and availability of water, as well as living factors such as the disappearance of different species through disease, predation, habitat destruction and overuse of resources of the introduction of new species.

6-8 LS2E – Investigations of environmental issues should uncover factors causing the problem and relevant scientific concepts and findings that may inform an analysis of different ways to address the issue.

6-8 LS3E – Adaptations are physical or behavioral changes that are inherited and enhance the ability of an organism to survive and reproduce in a particular environment.

ESE Standard 1 - Students develop knowledge of the interconnections and interdependency of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, national, and global levels.

Prevent the Pathway *Worksheet*

Name:_____

	Introduction Pathways		Pathway Prevention
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	